MP710
871.

JUN 5 1987 1987

Director
California Department of Fish and Game
1416 Ninth Street
Sacramento, CA 95814

Dear Director:

Enclosed is a copy of the fully executed agreement between the California Department of Fish and Game (Fish and Game) and the Bureau of Reclamation (Bureau) entitled "Interim Instream Flows and Fishery Studies in the Stanislaus River Below New Melones Reservoir." This agreement provides, among other things, for the withdrawal of the protest by Fish and Game to Applications No. 27319, 27320, 27321 and partial assignment of No. 14858. As such, a letter to the State Water Resources Control Board withdrawing the protest would be appropriate at this time.

The Bureau would like to thank you and your staff for the diligence and timeliness in completing this agreement. It is through such cooperation that the resources of the State of California can be best utilized.

Sincerely,

(s) DAVID G. HOUSTON
REGIONAL DIRECTOR

Enclosure

bc: Regional Solicitor, Pacific Southwest Region
Project Manager, Tracy Field Office
MP-400, 2800, 710
(each w/ encl.)

AGREEMENT BETWEEN
CALIFORNIA DEPARTMENT OF FISH AND GAME
AND
THE UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
REGARDING
INTERIM INSTREAM FLOWS AND FISHERY STUDIES
IN THE STANISLAUS RIVER BELOW NEW MELONES RESERVOIR

This AGREEMENT is made by and between the State of California, as represented by the Department of Fish and Game, hereinafter referred to as "Fish and Game", and the United States Department of the Interior, Bureau of Reclamation, hereinafter referred to as "Bureau", and both hereinafter collectively referred to as "Parties", for the combined purposes of (1) providing appropriate Stanislaus River instream flows as needed to maintain or enhance the fishery resource during an interim period in which habitat requirements are better defined, and (2) completing studies of the chinook salmon fisheries of the Stanislaus River.

RECITALS

THE PARTIES RECOGNIZE:

A. Chinook salmon stocks of the San Joaquin River and its tributaries represent important fishery resources of the State of California. These include salmon which annually utilize the Stanislaus River, downstream from Goodwin Dam, for the purpose of spawning, incubation, juvenile rearing and migration. All San Joaquin River system salmon stocks have been reduced in recent years, resulting from numerous factors affecting their habitat and reducing their survival, particularly during juvenile stages.

B. Through its operation, the Bureau's New Melones Reservoir can materially affect the amount and timing of instream flows available below (downstream) of Goodwin Dam, thereby affecting the welfare and success of salmon stocks and other fishery resources of the Stanislaus River and of the San Joaquin River in the reach between the Stanislaus River confluence and the San Joaquin-Sacramento River Delta. It is recognized, however, that the adequacy of instream flows in the San Joaquin River and Delta reaches is dependent upon conditions and instream flow releases from other upstream tributaries, in addition to the Stanislaus River.

C. During 1984, the Bureau filed Applications No. 14858, 27319, 27320, and 27321, before the California State Water Resources Control Board (Board), which in part sought permits to directly divert water for beneficial use at New Melones Dam and other points, as described in those applications. Fish and Game, acting on behalf of the people of the State California, filed a protest to the Bureau's applications on the basis

that, lacking appropriately scheduled instream flows, the proposed direct diversions could adversely affect salmon and other resources of the Stanislaus River and the reach of the San Joaquin River described in Recital B above.

D. In its protest, Fish and Game identified the need to perform detailed studies of the Stanislaus River salmon fishery for the purpose of prescribing an appropriate instream flow schedule. The need for such studies had earlier been identified in Decision D-1422 of the Board. The Parties, in coordination with the United States Department of the Interior Fish and Wildlife Service (the Service), have already cooperated, to some extent, in the design, partial funding and partial conduct of said studies, prior to execution of this AGREEMENT. As yet, insufficient study results are available, however to make the intended instream flow prescriptions.

The cooperative studies as agreed to by the Parties and the Service are outlined in the Plan of Study, a copy of which is attached hereto as Exhibit A of this AGREEMENT. The funding responsibilities and budget for the studies are provided for in the document attached hereto as Exhibit B.

E. The purposes of this AGREEMENT are:

1. To commit the Parties, within constraints imposed by Legislative approvals of their budgets, to the completion of a program of studies intended to identify the long-term instream flow and other physical needs of Stanislaus River chinook salmon.

2. To implement an interim instream flow schedule which will (1) protect the chinook salmon stock of the Stanislaus River during completion of said studies, and (2) provide for experimentation in the amount and timing of instream flows to ascertain if acceptable criteria for protection of salmon can be provided conjunctively with other beneficial water uses.

F. This AGREEMENT shall pertain only to fishery resources and habitat within the Stanislaus River and San Joaquin River as described in Recital B above. The Parties further recognize that there are other downstream activities which also materially affect the survival of downstream migrant chinook salmon from the Stanislaus River, and that said downstream aspects need to be addressed in the future. The parties acknowledge that despite the adequacy of instream flows which are provided for the Stanislaus River below Goodwin Dam, recovery of the fishery may be hampered, pending correction of existing problems associated with downstream diversions, Delta diversions and fish passage through the Delta.

G. It is the intention of Fish and Game that this AGREEMENT shall become the instrument through which it will provisionally dismiss its protest against the Bureau's applications, as described in Recital C.

AGREEMENT

NOW THEREFORE, the Parties agree as follows:

I. The Parties agree to implement the following program of fishery instream flow releases from New Melones Dam to provide (1) flows acceptable and reasonable for upstream migration, spawning, incubation, rearing and downstream migration of chinook salmon and (2) the basis for expedient completion of biological studies to identify long-term instream flow needs of the Stanislaus River below Goodwin Dam.

II. Each year the Bureau shall compute the supply available for annual fishery instream flow releases using the procedure described in Exhibit C. For the purposes of this AGREEMENT a year shall begin on March 1 and end on the last day of February of the succeeding calendar year.

An initial appraisal of the supply available for annual fishery instream flow releases will be computed and furnished to Fish and Game on February 1st of each year or as soon as practicable but no later than February 15th. This initial appraisal will be used by Fish and Game to produce a fishery instream flow release schedule for the first 15 days of March. This schedule shall be provided to the Bureau as soon as practicable, but no later than February 20th.

A second estimate of the supply available for annual fishery instream flow releases will be computed and furnished to Fish and Game on March 1st of each year or as soon as practicable but no later than March 10th. A preliminary 12 month fishery instream flow release schedule shall be provided to the Bureau as soon as practicable, but no later than March 15th. The final determination of the supply available will be computed and furnished to Fish and Game on April 1st of each year or as soon as practicable but no later than April 10th. The final fishery instream flow release schedule for the April through February period shall be provided to the Bureau no later than April 15th. Instream flow releases shall be provided by the Bureau in accordance with schedules furnished by Fish and Game.

A. The maximum annual supply available for fishery instream flow releases shall be 302,100 acre-feet and the minimum supply shall be 98,300 acre-feet.

B. Fish and Game agrees that fishery instream flow releases which may be requested, either for the purpose of study, or based upon the results of studies as herein provided, shall not exceed 1,250 cubic feet per second, except at the discretion of the Bureau for compliance with existing guidelines for flood control, water quality requirements, nondamaging flow levels, implementation of the Plan of Study (Exhibit A) and

other downstream considerations.

C. Both parties recognize that the determination of target storage as defined in Exhibit C is dependent on the amount of water being consumed by uses upstream of New Melones Reservoir, and by Oakdale Irrigation District and South San Joaquin Irrigation District.

(1.) The annual use of Oakdale and South San Joaquin Irrigation Districts shall be monitored and as the three year average water use increases to the maximum allowed by the 1972 Stipulation and Agreement between the Bureau and the Districts, the target storage specified in Exhibit C shall be modified in accordance with the schedule shown in Figure C-1, to protect authorized inbasin uses. Only those years in which the New Melones inflow equals or exceeds 654,000 acre-feet for the period from November 1 through October 31 of the following calendar year will be used to compute the three year average water use.

(2.) The consumptive use of water in the basin above New Melones shall be monitored on an annual basis. If the use of water under existing or new permits increases by 10,000 acre-feet per year over the present level, the provisions for fishery releases in excess of 98,300 acre-feet per year shall be renegotiated to accommodate the increased upstream use. Dry and critical year shortage criteria may also be considered during these negotiations. The present level of use of water above New Melones Reservoir is estimated to be 36,800 acre-feet per year.

D. Said fishery instream flow releases shall be made in a manner allowing for the implementation of the Plan of Study described in Exhibit A.

III. The fishery instream flow releases provided for in this AGREEMENT shall be made by the Bureau until long-term salmon protection standards are agreed to or adopted by the Board. At the time of completion of the studies described in Exhibit A, the results, along with other pertinent information shall be considered by the Parties in identifying an acceptable instream flow program. A Final Agreement is anticipated, which would contain mutual recommendations to afford long-term fishery resource protection. Said recommendations would be provided to the Board, together with a mutual request that they be implemented as a condition of any Permit or License issued pursuant to Applications No. 14858, 27319, 27320, and 27321. In the event said Final Agreement cannot be made, within a period of two years following concurrence of the Parties that the Plan of Study is completed, or six years following the last release of coded-wire-tagged salmon as described in Exhibit A, the Parties agree that either Party may submit its independent recommendations and request to said Board.

IV. Fish and Game agrees to dismiss its Protest to the Bureau's Applications No. 14858, 27319, 27320, and 27321, as filed before the Board provided any Permit issued pursuant to said Applications contains provisions sufficient to permit the implementation of paragraph III above.

V. The Parties agree that they will work with other water agencies in an attempt to implement a conjunctive use program that would augment river flows so as to improve habitat conditions for chinook salmon and other fishery resources. In that event, this AGREEMENT will be amended, as appropriate.

VI. Nothing herein shall be construed to require any action which would, of itself, constitute any infraction or violation of either the Constitution of the United States of America or the State of California, or of any Federal or State statute.

VII. It is the intent of the Parties to implement the Plan of Studies as described in Exhibit A. The Parties agree to diligently pursue approval for funding of the Plan of Studies (Exhibit A). It is recognized that said funding is contingent upon approval of the budgets of Fish and Game, the Bureau and Fish and Wildlife Service, by the State Legislature and United States Congress, as applicable.

VIII. This AGREEMENT may be modified, based upon written concurrence of both Parties, except that in the event this AGREEMENT becomes an instrument of either law or permit, concurrence of all concerned legal and/or permit agencies shall also be required.

6-2-87
(Date)

Pete Bontadelli
Jack C. Parnell, Director
California Department of Fish and Game

6-5-87
(Date)

David G. Houston, Regional Director
U. S. Bureau of Reclamation

PLAN OF STUDY

STANISLAUS RIVER FISHERY STUDY

April 1987

INTRODUCTION

This proposed study is needed to provide more precise information for developing measures to sustain salmon in the Stanislaus/San Joaquin River. The study will include evaluation of the downstream fishery flow requirements in the Stanislaus River. It is contemplated that the evaluations and data gathering will be performed over a period of about 7 years jointly by the Bureau of Reclamation (BOR), Department of Fish and Game (DFG), and U.S. Fish and Wildlife Service (USFWS). The 7 year study period may need to be extended for the salmon tagging studies if hatchery fish are unavailable or waterflows cannot be controlled in certain years.

The New Melones Project, as authorized by Public Law 87-874, provides 98,000 acre-feet of water for downstream fishery purposes in the Stanislaus River. In addition, up to 70,000 acre-feet for water-quality purposes would be made available as releases to the Stanislaus and lower San Joaquin Rivers.

It has been recommended by the DFG that substantially greater flows, possibly up to a total of approximately 302,000 acre-feet at Goodwin Dam, could be needed for fishery purposes in the Stanislaus River. Flows of this magnitude would require the full yield of the project and could significantly alter the project operations and economics. The largest portion of this release is required for spring outflow to improve the survival of juvenile salmon migrating out of the Stanislaus River and through the San Joaquin River and Delta. At the time of the water rights

These fish begin migrating from the Sacramento/San Joaquin estuary in late summer or early fall. Unsuitable oxygen and temperatures in the lower river near Stockton have delayed migration is some years. Improved waste treatment has minimized this problem in recent years. In normal years, conditions become adequate by September. Spawning begins in mid-to-late October, reaches a peak in Mid-November and ends in January. The young begin emerging from the gravel in late December. Some appear to migrate immediately out of the spawning area and others grow to smolting size in the spawning reach near where they were hatched.

The early fish generally reach smolting size in late March or April; the peak of smolt migration from the rivers is from mid-to-late May (June in good water years). Poor survival of outmigration leaving the streams in the later part of the outmigration period in low or average water years is thought to be affected by water diversions and unfavorable water conditions in the lower reaches of the tributaries, main stem San Joaquin River, and the Sacramento-San Joaquin Delta.

Runs in the Merced, Tuolumne and Stanislaus Rivers are capable of being significantly improved. They have been adversely affected by low streamflows, gravel degradation, degraded water quality, water temperature problems, and by State/Federal/District water storage/export projects. A brief summary of 10-year average fall chinook salmon escapement estimates for the major San Joaquin River tributaries including the Stanislaus River depicts the significance of the declines.

Period	Merced River	Tuolumne River	Stanislaus River	Mean Total
1953-1962	896	20,265	9,320	30,481
1963-1972	1,301	10,528	6,675	18,504
1973-1982	2,892	3,141	645	6,678

For the Stanislaus River, the pre-Tri-Dam (1953-60) and post-Tri-Dam operations (1961-81) are shown for the fall salmon escapements in the following tabulation:

Period	Stanislaus River Average Escapement
1953-1960 pre-Tri-Dam	10,900
1961-1981 post-Tri-Dam and pre-New Melones	3,450

OBJECTIVE

The primary objective of this study is to determine what measures are necessary to improve survival of the freshwater life stages of chinook salmon in the Stanislaus River and downstream migratory pathways. Tasks within this study are designed to determine the limiting biological factors and develop alternative management programs to improve juvenile salmon survival and ultimately adult salmon runs on the Stanislaus River. These programs will need to be consistent with the other functions and uses of the New Melones Project as specified in Public Law 87-874.

Information and alternatives developed by this study will be used by the management units of the Department of Fish and Game, U.S. Fish and Wildlife Service, and U.S. Bureau of Reclamation to improve the Stanislaus and San Joaquin River salmon fishery. Specific objectives of the Stanislaus River Fishery Study will include: (1) Identification of acceptable flow regimes for salmon spawning, juvenile production/growth and outmigration, (2) monitoring of annual spawning escapement, (3) evaluation of available spawning habitat and coordination of renovation and maintenance activities, (4) evaluation of operating scenarios at New Melones and Tulloch Reservoirs, and Goodwin Dam, (5) integration of biological data with BOR temperature and water quality studies, (6) integration of tributary data with existing movement and survival studies in the estuary and San Francisco Bay (Bay/Delta Project) to further define outmigration dynamics and constraints, and (7) coordinaton with Tuolumne River studies (New Don Pedro Project) and general problems (i.e., straying) of San Joaquin salmon.

PROPOSED STUDY PROGRAM

This 7-year proposed study program was developed jointly by representatives from the DFG, USFWS, and BOR. The field work and studies will be conducted by the DFG and the USFWS and to a lesser degree BOR. The study will include seven study elements. This study will also include the integration of tributary data with existing movements and survival studies in the estuary and San Francisco/Bay Delta Projects to further define outmigration dynamics and constraints. Most of the data

collection and specific studies relating to river characteristics will be conducted during the first 4 years of the study. Temperature modeling and flow evaluations, including possible renovation plans, will be completed in the later stages of this program. The study elements, study costs, and the proposed distribution of funding between DFG, BOR, and USFWS are discussed below. The study elements and activities are summarized in table 1. Costs are summarized in table 2.

Study Elements

1. Evaluate Instream Flow Requirements. The U.S. Fish and Wildlife Service with assistance from the Department of Fish and Game, will gather information for developing salmonoid habitat preference curves and possible transect locations during the initial years of the study. This will include performing a habitat preference study and an instream flow study scheduled for years 1 and 2, respectively. The USFWS will be the primary agency responsible for conducting the instream flow study to be assisted by representatives from DFG and the BOR. Aerial photography (1"=100' scale) will be obtained by the BOR to support field studies. Flow release evaluations relating to spawning habitat juvenile rearing habitat and downstream outmigration will be an important aspect of this study element. Reports will be prepared for the habitat preference study and the instream flow study.

2. Evaluate Distribution and Growth of Juvenile Salmon. Evaluation of spatial and temporal distribution and growth rates of juvenile salmon in relation to streamflow and habitat. During the study, there would be

Years:	(1) 86-87	(2) 87-88	(3) 88-89	(4) 89-90	(5) 90-91	(6) 91-92	92
T 1 - EVALUATE INSTREAM FLOW REQUIREMENTS (USFWS)							
A. Obtain information for probability of use curves	Habitat	Instream					
B. Transect selection and field data measurements	Preference	Flow					
C. Data analysis	Study	Study	XXX	XXX	XXX	XXX	
D. Flow release evaluations	XXX	XXX	XXX				X
ELEMENT 2 - EVALUATE DISTRIBUTION AND GROWTH (D&G) OF JUVENILE SALMON (CDFG)							
A. Evaluate D&G in Stanislaus River	XXX	XXX	XXX	XXX	XXX	XXX	
B. Evaluate D&G in lower San Joaquin River and South Delta	XXX	XXX	XXX	XXX	XXX	XXX	
C. Monitor thyroxine levels in fingerlings and smolts	XXX	XXX	XXX	XXX			
D. Data analysis	XXX	XXX	XXX	XXX	XXX	XXX	XX
ELEMENT 3 - DEFINE TIMING AND MAGNITUDE OF DOWNSTREAM MIGRATION (CDFG)							
A. Development of sampling gear and techniques	XXX	XXX	XXX				
B. Introduction of CWT fry from Merced River Fish Facility	XXX	XXX	XXX	XXX	XXX	XXX	XX
C. itor downstream migration of CWT fish at SWP CVP fish screens, Delta seining, Chipps sland trawling	XXX	XXX	XXX	XXX	XXX	XXX	XX
). Monitor ocean catch and spawning escapements for recovery of CWT	XXX	XXX	XXX	XXX	XXX	XXX	XX
. Monitor downstream migration of wild and CWT smolts	XXX	XXX	XXX	XXX	XXX	XXX	XX
. Data analysis		XXX	XXX	XXX	XXX	XXX	XXX
LEMENT 4 - DETERMINE ANNUAL SPAWNING ESCAPEMENTS (CDFG)	XXX	XXX	XXX	XXX	XXX	XXX	XXX
LEMENT 5 - EVALUATE SPAWNING HABITAT SUITABILITY AND IMPROVEMENT NEEDS (CDFG)							
. Map and evaluate existing spawning habitat	XXX	XXX	XXX				
. Plan habitat renovation project	XXX	XXX	XXX				
. Implement renovation plan			XXX	XXX			
. Evaluate utilization of renovated area			XXX	XXX	XXX		
LEMENT 6 - TEMPERATURE STATIONS AND MODELING (BOR)	INSTALL EQUIPMENT	O	E	M	P	E	R	A	T	U	R	E	M	O	D	E	L	I
7 - COORDINATE AND INTEGRATE STUDIES WITH SBR, USCOE, AFB, BAY DELTA (BOR)	XXX	XXX	XXX	XXX	XXX	XXX	XXX
Annual Reports	XXX	XXX	XXX	XXX	XXX	XXX	XXX

Table 2
Stanislaus [illegible] Fishery Study
(Costs $)

	Fiscal Years							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Entity and Items	87	88	89	90	91	92	93	Totals
DFG	(73,000)	(73,000)	(73,000)	(73,000)	(73,000)	(73,000)	(73,000)	(511,000)
BOR	(90,000)	(151,000)	(81,000)	(66,000)	(54,000)	(39,000)	(39,000)	(520,000)
Staff	9,000	20,000	10,000	10,000	10,000	10,000	10,000	79,000
Equip & O&M[a]	23,000	11,000	11,000	11,000	11,000	4,000	4,000	75,000
Instream Flows		80,000[b]	40,000[b]	25,000	13,000	5,000	5,000	168,000
Habitat Preference	58,000[b]	40,000[b]	-0-	-0-	-0-	-0-	-0-	98,000
Temp Model	-0-	-0-	20,000	20,000	20,000	20,000	20,000	100,000
FWS	(10,000)	(10,000)	(8,000)	(5,000)	(5,000)	(1,000)	(1,000)	(40,000)
TOTAL COSTS	173,000	234,000	162,000	144,00	132,000	113,000	113,000	1,071,000
FWS (Transfer Funds) $1,000's	(58)	(120)	(40)	(25)	(13)	(5)	(5)	

[a]Temperature stations will be in for all years ($4,000/yr O&M).
[b]For these years FWS will provide increased funding and BOR will also provide funds for habitat preference and instream flow studies.

possibly 6 years of different flow regimes provided in the river. These may include 2 years with D-1422 or authorized flow levels--98,000 acre-feet, 2 years with DFG flows recommended to the State Water Resources Control Board--260,000-302,000 acre-feet, and 2 other years with the flow release patterns to be mutually developed as a result of the instream flow analysis and other information received from the study. These flow conditions would also be used for evaluating downstream migration - study element 3. An active (boat) and/or passive (stationary) sampling program with appropriate gear will be implemented during January through June periods to determine the presence/absence of juvenile salmon, important parameters of habitats utilized and their distribution patterns under various flow regimes. Growth, condition factors, and physiological parameters associated with outmigration (e.g., thyroxine levels) will be monitored. This study element will cover the Stanislaus River, along with the observance of the juveniles in the lower San Joaquin River and south Delta areas.

3. Define Timing and Magnitude of Downstream Migration. Sampling will consist of seining, electrofishing, trawling and other appropriate methods that will be used to document the relationship of outmigration to various flow regimes. Smolt-sized salmon reared at Merced River Fish Facility (MRFF), marked with coded wire tags (CWT) will be released in the upper and lower ends of the Stanislaus River. They will be subsequently recaptured by (1) trawling in the lower San Joaquin River and Delta, (2) sampling catches at the SWP and CVP fish screens near

Tracy, and (3) in the ocean commercial and sport fisheries. These data will also verify data obtained in study element 2. Implementation of this element will be dependent on availability of fish at MRFF and the ability of BOR to control waterflows during critical periods.

4. Determine Annual Spawning Escapements. Determine annual adult escapement (timing and number) in the Stanislaus River. Weekly salmon carcass enumeration surveys will be run using appropriate boat(s) during mid-October through mid-December each year. Sex and size composition of the run will be determined and an expansion using standard mark-recapture mathematics (with modifications) will be made. Heads from all CWT fish will be preserved for later identification and tag recovery. Subsequent ground and aerial survey redd counts will be made and correlated to the number of females in the run(s).

5. Evaluate Spawning Habitat Suitability and Improvement Needs. Map and evaluate suitability of existing spawning habitat in the Stanislaus River. Aerial photos obtained in element 1 will be used to document suitable existing spawning habitat and this will be compared to previous survey results. Habitat improvement needs and renovation proposals will be determined.

6. Temperature Stations and Modeling. The BOR, during the first year of the study, will install the necessary temperature recording stations at various selected locations primarily in the lower San Joaquin River and southern delta channels. They will be operated throughout the 7-year study. During years 3, 4, 5, 6, and 7, a temperature model will

be developed by BOR and used to evaluate temperature impacts on salmon downstream migration and survival under alternative flow regimes.

7. Coordinate and Integrate Studies with USBR, USCOE, AFB, Bay Delta. Integrate and coordinate Stanislaus River study activities with the operation of New Melones and Tulloch Reservoirs and Goodwin Dam, temperature studies, and other studies of salmon movement and survival in the estuary and San Francisco Bay. The acquisition of input and coordination of studies will be made with DFG Region 4 representatives and other functions. Annual reports are to be prepared by DFG, USFWS, and BOR representatives which are to be completed no later than December of each year. These reports are to summarize the work accomplished as part of this study and to indicate the findings to date and develop recommendations to resolve the problems as appropriate.

Study Costs

A portion of the BOR study costs is for the annual costs to tag 200,000 salmon smolts for 6 years. The estimated study costs are shown in table 2.

The total estimated study cost for the 7 years would be approximately $1,071,000. The annual costs would range from $103,000 in the seventh year to a maximum of $234,000 in the second year. Costs are summarized for DFG, BOR, and FWS.

STANISLAUS RIVER FISHERY STUDY

STUDY COSTS

1. Proposed study funding is proved on page 2 of Exhibit B.
2. The actual funding level is contingent upon approval of the budgets of Fish and Game, the Bureau of Reclamation, and the Fish and Wildlife Service by the State Legislature and United States Congress, as applicable.

Table 2
Stanislaus River Fishery Study
(Costs $)

	Fiscal Years							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Entity and Items	87	88	89	90	91	92	93	Totals
DFG	(73,000)	(73,000)	(73,000)	(73,000)	(73,000)	(73,000)	(73,000)	(511,000)
BOR	(90,000)	(151,000)	(81,000)	(66,000)	(54,000)	(39,000)	(39,000)	(520,000)
Staff	9,000	20,000	10,000	10,000	10,000	10,000	10,000	79,000
Equip & O&M[a]	23,000	11,000	11,000	11,000	11,000	4,000	4,000	75,000
Instream Flows		80,000[b]	40,000[b]	25,000	13,000	5,000	5,000	168,000
Habitat Preference	58,000[b]	40,000[b]	-0-	-0-	-0-	-0-	-0-	98,000
Temp Model	-0-	-0-	20,000	20,000	20,000	20,000	20,000	100,000
FWS	(10,000)	(10,000)	(8,000)	(5,000)	(5,000)	(1,000)	(1,000)	(40,000)
TOTAL COSTS	173,000	234,000	162,000	144,00	132,000	113,000	113,000	1,071,000
FWS (Transfer Funds) $1,000's	(58)	(120)	(40)	(25)	(13)	(5)	(5)	

[a]Temperature stations will be in for all years ($4,000/yr O&M).
[b]For these years FWS will provide increased funding and BOR will also provide funds for habitat preference and instream flow studies.

Exhibit C

Purpose

1. This exhibit defines the equation used to compute the supply available for annual instream flow releases.

Variables

2. When used in this exhibit, the following variable representations shall be applied:

(a) "M" is the variable label that represents the calendar year month number of the current month of calculation. For example, when the calculation is performed in March, M is equal to 3.

(b) "SAAIF(M)" is the variable label that represents the supply available, computed in month "M", for annual instream flow releases in acre-feet.

(c) "AIF" is the variable label that represents the amount of instream flow in acre-feet released since March 1 of the current year.

(d) "EOMS(M-1)" is the variable label that represents the New Melones end-of-month storage in acre-feet for the previous month.

(e) "PI(M)" is the variable label that represents the projected inflow to New Melones reservoir, in acre-feet, for the current month through September of the current year.

(f) "POSWD(M)" is the variable label that represents the projected water demands, in acre-feet, for the Oakdale and South San Joaquin Water Districts from the current month through September of the current year.

(g) "PCWD(M)" is the variable label that represents the projected contracted CVP Stanislaus River water demands in acre-feet for the current month through September of the current year.

(h) "PWQWD(M)" is the variable label that represents the projected water demands in acre-feet associated with supporting downstream water quality and minimum flow committments for the current month through September of the current year. These flow requirements are those contained in SWRCB D-1422 and the Agreement with the South Delta Water Agency.

(i) "EVAP(M)" is the variable label that represents the estimated evaporation from New Melones reservoir in acre-feet from the current month through September of the current year. The evaporation rates applied in projecting New Melones reservoir evaporation in acre-feet per acre are:

MAR	APR	MAY	JUN	JUL	AUG	SEP
.199	.386	.507	.581	.764	.711	.595

(J) "TS" is the variable label that represents the September end-of-month target storage in acre-feet. This value is influenced by the level of upstream and downstream demands for water from New Melones reservoir. Given the assessment of current conditions related to water demands on New Melones a target storage of 1,700,000 acre-feet shall be used. This value can be changed by mutual agreement of the parties as reassessment of these conditions indicate the need for change.

Equation

3. The following equation shall be used to compute the supply available for annual instream flow releases on the Stanislaus River at Goodwin Dam:

$$SAAIF(M) = AIF + EOMS(M-1) + PI(M) - POSWD(M) - PCWD(M) - PWQWD(M) - EVAP(M) - TS$$

Figure C-1

TARGET STORAGE TABLE
(Thousands of Acre-feet)

Oakdale I. D. and South San Joaquin I. D. Demand	-	600	620	640	650	654
Required Target Storage for New Melones Reservoir	-	1700	1700	1700	1750	1750